Palaeontological desktop study of a 10 ha expansion of the Khumani low grade mine at Sishen, Northern Cape Province.

Report prepared by Palaeo Field Services, PO Box 38806 Langenhovenpark 9330.

28 June 2017

Summary

The desktop investigation indicates that the development footprint is underlain by Palaeoproterozoic Gamagarra Formation sediments that are not considered to be palaeontologically sensitive. The site is capped by superficial (Quaternary) deposits considered to be of low to very low palaeontological sensitivity, because the impact area is degraded and not situated within or near pan, alluvial or spring deposits (considered to be potentially fossiliferous in the region). The proposed development may proceed as far as the palaeontological heritage is concerned and a phase 1 impact study (site visit) is not necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint. In the unlikely event of fossil discovery within the Quaternary overburden during the operational phase of the development (i.e. modern-looking but more or less lithified animal bones and teeth), a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

Introduction

The report is a preliminary assessment of potential palaeontological impact with regard to proposed expansion covering approximately 10 ha located on the Farm King 561 near Shishen in the Northern Cape Province (**Fig. 1 & 2**).

Site Coordinates:

A) 27°50'50.27"S 23° 0'1.34"E

B) 27°50'59.52"S 23° 0'19.64"E

C) 27°51'4.35"S 23° 0'18.70"E

D) 27°50'58.53"S 23° 0'8.52"E

E) 27°50'52.89"S 22°59'59.33"E

Methodology

The assessment was carried out in accordance with National Heritage Resources Act 25 of 1999 with the aim to assess the potential impact on palaeontological heritage resources that may result from the proposed development. The palaeontological significance of the affected areas were evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature.

Assumptions and Limitations

The assessment provided within this report is based upon a desktop study without the benefit of a site visit. As such, the presentation of geological units present within the study area is derived from the 1:1 000 000 scale map of South Africa and the 1:250 000 scale geological map 2722 Kuruman, which may vary in their accuracy. It is also assumed, for the sake of prudence, that fossil remains are always uniformly distributed in fossil-bearing rock units, although in reality their distribution may vary significantly.

Background

The proposed development footprint is located on degraded terrain that is underlain by Palaeoproterozoic sediments of the locally ferrugenised Gamagarra Formation (Olifantshoek Supergroup) (**Fig. 3**). The Gamagarra Formation consists of shales with interbedded quartzite that are underlain by a basal haemitite-pebble conglomerate (Moen 2006). The formation is not considered to be palaeontologically sensitive. Palaeontologally significant superficial deposits in the region are largely represented by pan deposits, such as the nearby Kathu Pan dolines (centre c. 27° 39'50"S, E3° 0'30"E) that were developed within the Tertiary sequence of the Kalahari Group (Butzer *et al.,* 1978; Beaumont *et al.,* 1984; Beaumont 2004).

Impact Statement Recommendation

The desktop investigation indicates that the development footprint is underlain by Gamagarra Formation sediments that are capped by superficial (Quaternary) deposits considered to be of low to very low palaeontological sensitivity, because the impact area is degraded and not

situated within or near pan, alluvial or spring deposits (considered to be potentially fossiliferous in the region). The proposed development may proceed as far as the palaeontological heritage is concerned and a phase 2 impact study is not necessary, provided that all excavation activities are restricted to within the boundaries of the development footprint. In the unlikely event of fossil discovery within the Quaternary overburden during the operational phase of the development (i.e. modern-looking but more or less lithified animal bones and teeth), a professional palaeontologist must be called in immediately to confirm and record the finds. In the meantime, *ex situ* remains must be wrapped in paper towels or heavy duty tin foil and stored in a safe place. The material should not be washed or cleaned in any way. *In situ* material must be kept in place and protected from further damage by covering it with light but rigid object like a box, bucket or metal sheet until further confirmation by the palaeontologist.

References

Beaumont, P.B., 2004. Kathu Pan and Kathu Townlands/Uitkoms. McGregor Museum. In: Morris, D., Beaumont, P.B. (Eds.), *Archaeology in the Northern Cape: Some Key Sites. Southern African Association for Archaeologists* Postconference Excursion, Kimberley, pp. 50–53.

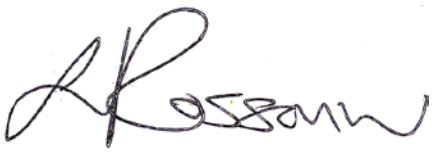
Beaumont, P.B., Van Zinderen Bakker, E.M., Vogel, J.C., 1984. Environmental changes since 32,000 BP at Kathu Pan, Northern Cape. In: Vogel, J.C. (Ed.), *Late Cenozoic Palaeoclimates of the Southern Hemisphere*. Balkema, Rotterdam, pp. 329–338.

Butzer, K.W., Struckenrath, R., Bruzewicz, A.J., Helgren, D.M., 1978. Late Cenozoic paleoclimates of the Ghaap Escarpment, Kalahari margin, South Africa. *Quaternary Research* 10, 310–339.

Moen, H.F.G. 2006 The Olifantshoek Supergroup **In**: Johnson, M.R, Anhaeusser, C.R. and Thomas, R.J. (Eds.) *The geology of South Africa*, pp. 237-260. Geological Society of South Africa, Johannesburg & the Council for Geoscience, Pretoria.

DECLARATION OF INDEPENDENCE

I, Lloyd Rossouw, declare that I act as an independent specialist consultant. I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference. I have no interest in secondary or downstream developments as a result of the authorization of this project and have no conflicting interests in the undertaking of the activity.



28 / 06 / 2017

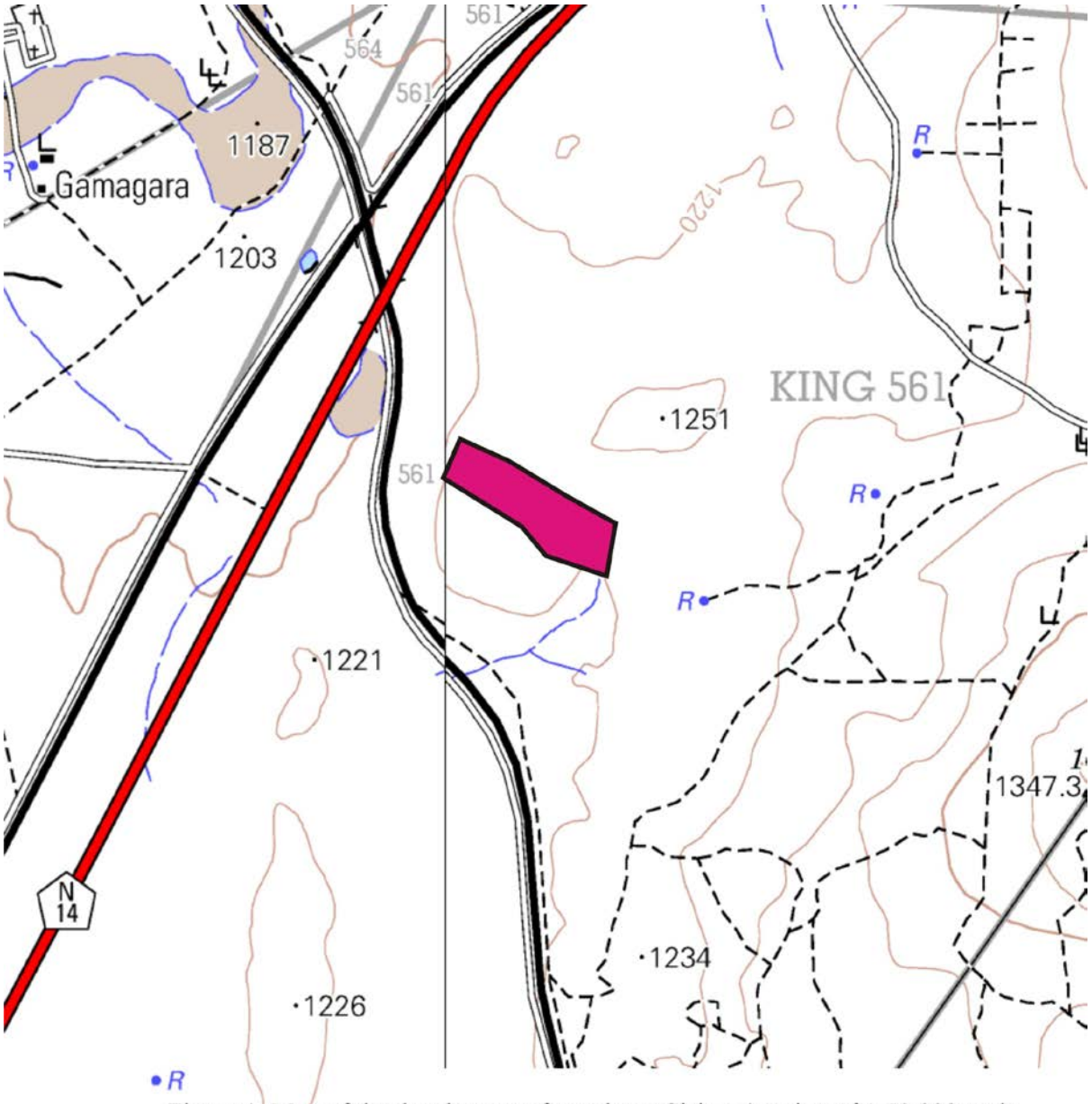


Figure 1. Map of the development footprint at Sishen (portion of 1:50 000 scale topographic 2723CC Ga-Thlose).

Figure 2 Aerial view and layout of the study area.

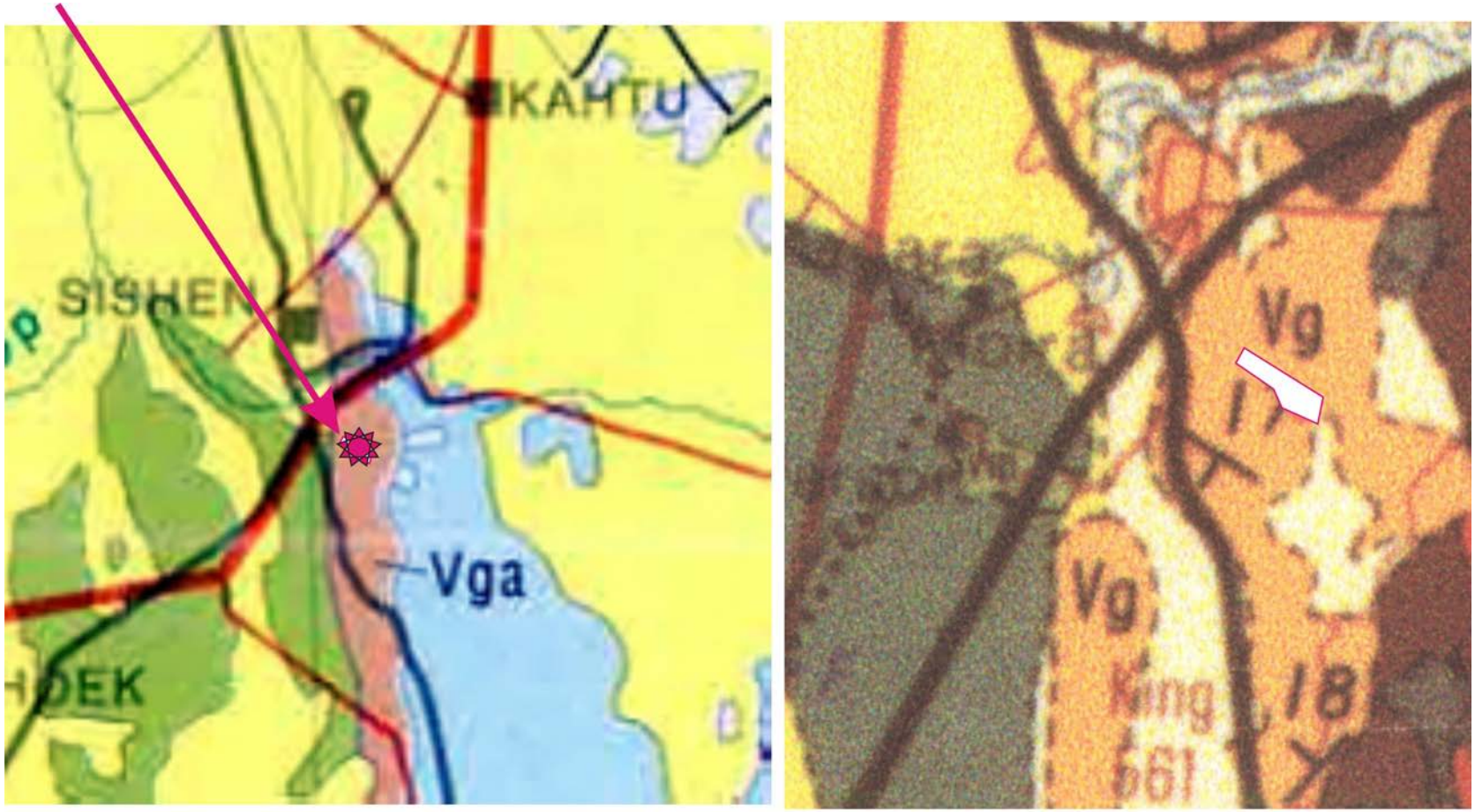


Figure 3. According to the 1:1 Ma scale geological map of SA and the 1:250 000 scale geological map 2722 Kuruman, the study area is underlain by ferrugenised sediments of the Palaeoproterozoic Gamagarra Formation (Olifantshoek Supergroup, *Vga*, *Vg*).